Investigation of cloud-aerosol interaction for extreme precipitation events using FV3GFS

Sarah Lu* and Sheng-Po Chen, State University of New York at Albany, NY

Shrinivas Moorthi, Yu-Tai Hou, Anning Cheng, and Fanglin Yang, NOAA/NWS/NCEP/EMC, MD

*: clu4@albany.edu

While understanding the climate impacts of the complex cloud-aerosol-radiation interactions remains a major frontier in climate sciences, there have been significant processes in developing process-level representations of clouds and aerosols as well as in understanding the processes relevant to aerosol-cloud-radiation interactions. A SUNYA-NCEP-GMAO collaborative project, co-funded by NOAA CTB (Climate Test Bed) and NGGPS (Next Generation Global Prediction System), implemented a double-moment cloud microphysics scheme and coupling it with a modal aerosol model in NEMS GFS (NOAA Environmental Modeling System, Global Forecast System). The physically-based cloud and aerosol package is now transitioned into NGGPS atmospheric model (FV3GFS). In this presentation two extreme precipitation events, New York snow storm in January 2014 and Louisiana flooding in August 2016, are investigated. We will investigate whether the model with improved aerosol-cloud package could better capture cloud properties and lead to improved weather forecasts. We will also explore how much complexity is needed to accurately represent the aerosol processes and effectively account for aerosols effects.